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October 24, 2002

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Mr. Dion Novak
Remedial Project Manager (SR-6J)
U.S. Environmental Protection Agency
Region 5
77 W. Jackson Blvd
Chicago, IL 60604-3590

Subject: WA No. 136-RSBD-B5Y7, Contract No. 68-W6-0025
Eagle Zinc Site, Hillsboro, Illinois
Review Comments of Phase I Source Characterization Technical Memorandum

Dear Dion:

As requested, we have reviewed ENVIRON's *Technical Memorandum for Remedial Investigation Phase 1: Source Characterization* dated October 2002. Comments to the Technical Memorandum are attached.

We hope that you find our comments and recommendations helpful. Please call if you have any questions regarding this information.

Sincerely,

CH2M HILL

Cherie Wilson

for Tim Biggs
Site Manager

Eagle Zinc Ph 1 TM Cover Letter.doc

c: Stephen Nathan, PO/U.S. EPA, Region 5 (w/o enclosure)
Dave Alberts, CO/U.S. EPA, Region 5 (c/o Thomas Harrison, CS) (w/o enclosure)
Ike Johnson, PM/CH2M HILL, MKE
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Remedial Investigation
Phase I: Source Characterization Technical Memorandum
Eagle Zinc Company Site (October 2002)

Narrative

1. The page numbers listed in the Contents section do not match the narrative page numbers. Suggest updating the Contents page numbers.

2. Page 1, Section I, Part A, 2nd paragraph, 3rd sentence: Suggest specifying the media that is being characterized.

3. Page 5, Section II, Part B, 1st full paragraph, 4th sentence: Suggest adding "XRF screening results of" between "...highest" and "metals...".

4. Page 5, Section II, Part B, Footnote 2: Suggest adding text stating that beryllium and thallium were not included as part of the XRF screening.

5. Page 6, Section II, Part C, 2nd paragraph, 3rd sentence: Disagree that sediment sample SD-WD-10 should be considered a background sample as it is located in the drainage area just south of the site, downgradient from areas of the site which have known PRG exceedances.

6. Section III, General: Suggest a brief summary be provided for all sections and the reader be referenced to the Work Plan for additional detail.

7. Page 10, Section III, Part G: Since essentially no information on ecological setting was provided in the work plan (except for a brief mention of surface water/wetlands under hydrology), the Tech Memo should provide a brief summary on the topic. A basic understanding of the site ecology is necessary to appropriately characterize nature and extent of contamination and to plan for Phase II sampling. Level of detail provided should be commensurate with the potential importance of the ecological receptors present and the level of detail provided human health issues. Lacking this information made it difficult to conduct a thorough ecological risk review of the appropriateness of sample media, locations, and numbers.

8. Page 11, Section IV, Part A: The soil PRGs selected (taken from Illinois Tiered Approach to Corrective Action Objectives) are based upon human health and might not be representative of ecologically based PRGs. Suggest that ecologically based PRGs also be used in order to ensure that the understanding of the Nature and Extent of contamination reflect the potential for ecological risk issues.

9. Page 11, Section IV, Part A, 1st paragraph, 4th sentence: Suggest adding "are" after "...PRG" and before "listed...".].

10. Page 11, Section IV, Part A, 1st paragraph: Suggest clearly stating the exposure scenario (residential or commercial/industrial land use, soil leaching to groundwater, etc.) associated with the screening criteria presented throughout the document. Suggest

substituting "screening levels" or "screening criteria" for "PRGs" to avoid confusion with USEPA Region 9 PRGs.

11. *Page 11, Section IV, Part A, 3rd paragraph, 2nd sentence: Suggest providing the Illinois* TACO reference for average arsenic background levels in non-metropolitan statistical areas. Suggest providing further description of the statistical basis for the arsenic comparison value. For example, is it an arithmetic average, UCL or UTL value? Please describe the decision rule underlying the conclusion that arsenic detected in soil resembles background based on comparison of individual values to an apparent statewide average.

12. Page 11, Section IV, Part A, Footnote 6: Suggest adding text that indicates the SROs are for commercial/industrial land use.

13. Page 12, Section IV, Part A, 1st sent: Suggest adding a space between "11" and "mg/kg".

14. Page 12, Section IV, Part A, 2nd paragraph, 2nd sentence: Suggest replacing the word "many" with "all" as Appendix C indicates that all cadmium readings were "<LOD".

15. Page 12, Section IV, Part A, 2nd paragraph, 2nd sentence: This sentence is confusing. Is it intended to state that "the Zn/Cd ratio from samples in which both metals were detected by the analytical laboratory was used to estimate the Cd concentrations at each screening location where direct estimation by the XRF was not possible"? Regardless, it would seem more appropriate to use the fixed laboratory soil analytical data generated during GBI's 1998 investigation and IEPA's 1993 investigation (on-site soil sample results) to estimate the extent of metals concentrations exceeding PRGs rather than estimations based on field screening tools, inferred metals ratios, and computer modeling.

16. Page 12, Section IV, Part A, General: Suggest that if XRF data is used to predict extent of soil metal concentrations that exceed PRGs then a comparison of fixed laboratory analytical data and XRF field screening results should be presented to support the reliability of using this field screening data.

17. Page 12, Section IV, Part A, 2nd paragraph: The rationale for drawing a linear relationship between zinc and cadmium concentrations needs to be more clearly explained. As it is written, it potentially leads the reviewer to the conclusion that cadmium impacts in soil have been significantly understated, and that XRF was not a robust analytical technique for cadmium. If cadmium could not be detected directly using XRF due to elevated instrument detection limits, what is the source for the cadmium data used in the plot generated in Appendix D? The data evaluation used to generate the plot in Appendix D needs to be described in further detail. Visual analysis indicates that there are more outliers than would be expected for a strong linear relationship with a coefficient of correlation of 0.9 ($r^2 = 0.8133$, $r = 0.9018$). Further details of this analysis should be provided, if it is going to be used to support characterization of cadmium in soil.

18. Page 12, Section IV, Part A, 3rd paragraph: Based on the comments in the 2nd paragraph of this section, identification of AOCs may not be accurate regarding analysis of

cadmium data. The areas where these metals are considered COCs may need to be revisited based on the revised analysis of zinc/cadmium data.

19. Page 13, Section IV, Part B, 1st paragraph, 1st sentence: The statement that "No VOCs...were detected in sediments above the respective PRGs" is incorrect. Although an explanation of the vinyl chloride PRG exceedance in sample SD-WD-9D is provided in footnote 8, there is the possibility that the VOC exceedance is related to site operations. Sediment sample X-206 (collected by IEPA in 1993) had VOC concentrations of 1,1,1-trichloroethane (290J µg/kg), methylene chloride (160J µg/kg), 2-butanone (48 J µg/kg), and toluene (36 J µg/kg). This on-site sample was collected at the north end of the west drainage area, north of the SD-WD-9D sample.

20. Page 13, Section IV, Part B, General: Suggest the narrative include a discussion of the presence/absence of surface water in the drainageways at the time of sediment sample collection.

21. Page 13, Section IV, Part B, Footnote 8: Suggest adding text that indicates the sediment PRGs are Illinois TACO Tier 1 SROs for commercial/industrial land use. Change 10 mg/kg to 10 µg/kg and change 7.8 mg/kg to 7.8 µg/kg.

22. Page 13, Section IV, Part B, 2nd paragraph, 3rd sentence: Suggest changing the sentence to read "Antimony exceeded the soil leaching to groundwater PRG of 5 mg/kg in sample SD-WD-7."

23. Page 13, Section IV, Part B, Footnote 9, 2nd sent: Suggest changing "...l0W" to "...the".

24. Page 13, Section IV, Part B, 1st paragraph, 2nd full sentence: Suggest changing "sample SD-ED-C" to "sample "SD-ED-16".

25. Page 14, Section IV, Part C, 1st paragraph, 3rd sentence: Suggest adding "the RCRA hazardous waste threshold value of" after "The TCLP lead results above...".

26. Page 14, Section IV, Part C, 1st paragraph, last sentence: The sentence is vague. Suggest changing the sentence to read "No other metals had TCLP results in excess of their respective RCRA hazardous waste threshold values".

27. Page 16, Section V, General: As previously described, identification of the AOCs may need to be revised. It may not be appropriate to provide an evaluation of potential exposure pathways and receptors at this early stage in the process. Consider either deleting the table presenting potential exposure routes or revising the table as outlined in comments 28 through 34.

28. Page 15, Section V,

29. Page 15, Section V, COCs table: Based on the analytical results of the 1998 GBI investigation, lead should be added to the On-Site Soil column. Of the 50 samples analyzed (44 field and 6 IEPA split samples), more than one-half exceeded the ingestion/inhalation PRG of 400 mg/kg for industrial/commercial land use. Ten samples had concentrations 10 times higher than this PRG. Twelve samples had TCLP lead levels in excess of the RCRA hazardous waste threshold value of 5 mg/L. The tables in Section V should be modified to include these COCs.

30. Page 15, Section V, COCs table: Based on the analytical results of the 1998 GBI investigation, nickel, silver, lead, thallium and 1,1,1-trichloroethane should be added to the Sediment-Western Drainageway column. Sediment sample X-206 (collected by IEPA in 1993) had concentrations of 1,1,1-trichloroethane (290J µg/kg), nickel (583 mg/kg), silver (14.1 mg/kg), lead (932 mg/kg) and thallium (3.8 mg/kg) that exceeded, at a minimum, the soil leaching to groundwater PRG for industrial/commercial land use. The tables in Section V should be modified to include these COCs.

31. Page 16, Section V, AOCs table: Based on the analytical results of the 1998 GBI investigation, stockpiles RR1-1, RR1-2, RR1-4, RRO-12, RCO-10, and CPH-6 should be added to the Residues column. Each of these stockpiles had TCLP lead concentrations in excess of the RCRA hazardous waste threshold value.

32. Page 16, Section V, Potential Exposure Routes table: Suggest adding ecological receptors to the On-Site Soil column, listing the soil leaching to groundwater COCs (Zn, Cd, and Pb) and adding ingestion/inhalation COCs (Cd and Pb) to the Exposure Routes.

33. Page 16, Section V, Potential Exposure Routes table: Suggest adding ecological receptors to the On-Site Sediments column and adding the noted Exposure Routes.

34. Page 16, Section V, Potential Exposure Routes table: Suggest adding an On-Site Residues column and listing the appropriate Potentially Affected Population and Exposure Routes.

35. Page 18, Section VI, Part A, General: Suggest that text be added to indicate the proposed surface water analytes.

36. Page 18, Section VI, Part B, General: Suggest that text be added to indicate that groundwater samples will be collected and analyzed from all temporary piezometers and permanent monitoring wells. Proposed analytes should also be stated.

General

1. The conceptual model presented in Section V does not integrate ecological receptors or issues. Therefore it is not possible to determine whether the Phase 2 sampling program will provide the information that might be necessary to adequately assess ecological risk.

   A general concern is that ecological risk needs and issues are not being integrated into the RI/FS process. Data collection seems to be solely focused on human health risk needs without consideration of ecological risk needs, and therefore might not be adequate when the ERA is conducted. This is a potential problem because it could then result in additional investigations that might be more efficiently incorporated into the currently planned investigations. In summary, the ecological risk process appears to be being conducted out of phase with the rest of the RI process. This can lead to delays and inefficiencies if ecological issues need to be resolved/investigated late in the process.

   Given the limited understanding of the contaminant extent at this time, it is premature to reach conclusions about receptor pathways. We suggest noting that future modifications to the Site Conceptual Model may be required as additional data is

collected an evaluated. The receptors identified may not be the correct receptors to consider in the future.

2. It seems it would have been appropriate to use the XRF as a screening tool to help identify sediment sample locations. While the general sample locations seem acceptable, it may have been useful to use the XRF to target specific sample locations.

3. Based on the metals results for on-site sediment sample SD-WD-9, suggest collecting a co-located surface water sample for metals analysis.

4. Suggest collecting background surface water sample from the west drainage area at location SD-WD-5 rather than SD-WD-10. SD-WD-10 is located in the drainage area just south of the site, downgradient from areas of the site which have known PRG exceedances.

5. It would seem more appropriate to compare off-site sediment and surface water sample concentrations to residential land use PRGs rather than industrial/commercial land use PRGs. Residential areas exist adjacent to the site property and Lake Hillsboro is used for recreational purposes. After comparing the off-site sediment concentrations to the residential land use PRGs, the list of COCs should be adjusted accordingly, if necessary.

6. Will soil samples be collected during temporary piezometer and monitoring well installations? If so, will they be submitted for laboratory analysis? If so, what are the proposed analytes?

7. Clarify whether or not XRF data will be used in the risk assessment. If these data are to be used to estimate risks, note that XRF data are field screening data, and may not achieve the analytical DQOs needed for risk assessment.

Tables

1. Table II-1, page 2 of 5: The soil boring depth for A2-19 is listed as 4 feet, yet the sample depth is listed as 6 feet. Information should be corrected.

2. Table IV-4, page 1 of 2: The table lists a Cd PRG exceedance result of 33 mg/kg for sample A3-25-2 and a Cd result of 6.3 mg/kg for sample A3-20-2, but Figure IV-3 lists a Cd PRG exceedance result of 33 mg/kg for sample A3-20-2 and no exceedance for sample A3-25-2. Which is correct?

Figures

1. General: No residue piles are depicted north of the southwest pond. Residue was noted to exist in this area during the October 2002 site visit with USEPA, ENVIRON, and CH2M HILL.

2. Figure IV-4: Suggest changing the sample ID in the box near SD-ED-16 from "SD-ED-6" to "SD-ED-16".

3. Figure IV-4: Suggest depicting the stream segment from which sample SD-WD-10 was collected from as an AOC as arsenic exceeded the PRG.

4. Figure IV-4: Suggest adding vinyl chloride as a COC to the box for SD-WD-7 as the value exceeded the PRG.

5. Figure IV-5: Suggest replacing "( ) = TCLP lead above 5.0 mg/L" with "(5) TCLP lead above the RCRA hazardous waste threshold".

6. Figure VI-2: Suggest depicting drainageways on the figure.

7. Figure VI-2: Suggest moving the proposed northern-most permanent well to the general area south (downgradient) of soil sample location WA-9, which had the 2nd highest Cd concentration. The currently proposed location is located very near a proposed temporary piezometer, which would most likely provide duplicated results. The suggested modified location would provide better spatial coverage in the southwest part of the site (downgradient of several residue piles and soil sample locations with PRG exceedances) and would be located near the western drainage area, which had VOCs detected in sediments in this and historical investigations. Suggest that groundwater samples be analyzed for VOCs and metals.

8. General: Suggest that all figures be updated to include the storm water retention ponds near the manufacturing area and other site features included on the topographic survey map in Appendix A.

9. General: Suggest incorporating historical laboratory analytical results onto Figures IV-1, IV-4, and IV-5 and estimating extent of exceedances.

Appendices

1. Appendix B: CH2M HILL copy of report is missing the following boring logs: A1-5, A1-18, A1-20, A1-22, A3-1, A3-3, A3-5, A3-7, A3-8, A3-9, A3-11, A3-12, A3-15 through A3-24, A4-1 through A4-23, A4-25, and NA-1 through NA-3.

2. Appendix B: Sample Ids are missing from all logs but one.

3. Appendix C: Suggest adding notes that describe the various acronyms, abbreviations, units of measure, etc.

4. Appendix C: Although it is stated in the Work Plan that soil samples would be collected from the upper one-foot of native soils beneath the residue, it would seem more appropriate to collect samples from borings at intervals exhibiting elevated XRF values. For example, intervals exhibiting the two highest XRF zinc values in Area 3 (3878.4 in boring A3-4 at 4 feet and 3009.6 in A3-22 at 6 feet) were not submitted for laboratory analysis. Intervals exhibiting the two highest XRF zinc values in Area 4 (5139.2, which was the 3rd highest zinc value recorded during the entire investigation, in boring A4-2 at 4 feet and 3539.2 in A4-19 at 3 feet) were not submitted for laboratory analysis. An interval exhibiting the second highest XRF zinc values in the Western Area (2840 in boring WA-8 at 4 feet) was not submitted for laboratory analysis.

5. Appendix C, page 12 of 22: Suggest expanding the Fe column so the values can be read.

6. Appendix C, page 14 of 22: Data for WA-8 is listed in two separate locations with different XRF values listed. Which is correct?

Other

1. RI/FS Work Plan, page 20: The text states that an evaluation of off-site airborne migration would be evaluated through visual inspection during sampling. Suggest that this evaluation be discussed in the Tech Memo.

2. RI/FS Work Plan, page 27: The text states that the quantity of existing residue at the site would be discussed in the Tech Memo. Suggest that this issue be discussed in the Tech Memo.

3. PSE Report: The CH2M HILL copy of this report contained no figures. Please provide the figures.

4. August 9, Monthly Progress Report: The report includes a discussion of residue existing below the water table in borings A4-5, A1-18 and A1-22. No soil samples were collected from these borings. The report states that this issue would be addressed in Phase 2 of the RI but no wells are proposed in the area near A4-5. Suggest moving the proposed location of the temporary well in the north-central part of the site (the one co-located with the proposed permanent well) to a location just downgradient (south) of A4-5. Proposed monitoring well locations in the southwest part of the site should provide sufficient groundwater data near borings A1-18 and A1-22. A discussion of this issue should be included in the Phase I Tech Memo.

5. August 9, Monthly Progress Report: The report states that only 15 of the proposed residue piles were sampled in Phase I of the RI. The rationale for this is discussed in the report and should also be included in the Phase I Tech Memo.